

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A structure of a multi-input multi-output multicarrier code division multiple access (MIMO MC-CDMA) communication system comprising at least one transmitter and at least one receiver, the transmitter comprising:

a de-multiplexer for receiving a user's data and outputting the data divided into a plurality of parallel data streams;

a plurality of space time block encoders individually receiving the parallel data streams of the de-multiplexer and outputting the data streams after encoding;

a plurality of space-path spreaders, at least one of said plurality of space-path spreaders individually receiving outputted data from at least one of said plurality of the space time block encoders and outputting received data after spreading with a pre-designed different and orthogonal space-path spreading code codes pre-designed to pre-suppress multiple access interference (MAI) and to pre-equalize multiple paths in the communication system,

wherein a number of said at least one space-path spreaders in relationship to a number of said at least one space time block encoders is selected to adjust a diversity gain and transmission speed in said communication system; and

a plurality of transmit antennas, each transmit antenna ~~receives~~ receiving outputted data from each said at least one space-path spreader and transmitting received data through the multiple paths.

2. (Original) The structure of the communication system of claim 1, wherein the de-multiplexer receives sets of the user's data, each user's data is proceeded with the de-multiplexer, the space time block encoders and the space-path spreaders, and sets of the proceeded user's data are collected at the transmit antennas and transmitted with the transmit antennas.

3. (Currently Amended) The structure of the communication system of claim 2, wherein the structure comprises a plurality of groups composed of the de-multiplexer, the space time block encoders and the space-path spreaders, each group is used for individually proceeding one of the sets of the user's data, and sets of the proceeded user's data are collected at the transmit antennas and transmitted with the transmit antennas.

4. (Canceled)

5. (Currently Amended) The structure of the communication system of claim 1, wherein the data transferred to the transmit antennas is ~~firstly~~ first transformed to a time domain data with inverse fast Fourier transform (IFFT) and ~~added~~ a guard time is added.

6. (Original) The structure of the communication system of claim 1, wherein the communication system is a wireless transceiver system.

7. (Original) The structure of the communication system of claim 6, wherein the transmitter is one of a base station.

8. (Currently Amended) The structure of the communication system of claim 1, wherein the receiver comprises:

a plurality of receive antennas for receiving data transmitted by the transmit antennas;

a plurality of matched filters individually receiving data received by the receive antennas and despreading it in accordance with the space-path spreading code;

a space-time linear combiner receiving data dispread by the matched filters and outputting received data after combining;

a BLAST detector receiving data ~~outputted~~ output by the space-time linear combiner, separating mutually interfering ~~signal~~ signals from the multiple transmit antennas, obtaining diversity gain, and outputting operated data; and

a multiplexer receiving data outputted by the BLAST detector and outputting data after multiplexing.

9. (Original) The structure of the communication system of claim 8, wherein data received by the receive antennas is transferred to the matched filters after taking fast Fourier transform (FFT) and removing guard time of data.

10. (Original) The structure of the communication system of claim 1, wherein the receiver is a mobile station of a wireless communication system.

11. (Currently Amended) The structure of the communication system of claim 8, wherein the receiver can only receive data matched by the space-path spreading code of the receiver.

12. (Original) the structure of the communication system of claim 1, wherein the space time block encoder is connected to the space-path spreader by group.

13. (Currently Amended) The structure of the communication system of claim 1, wherein each space time block encoder is connected to more than one space-path spreaders spreader.

14. (Currently Amended) A multi-input multi-output multicarrier code division multiple access (MIMO MC-CDMA) communication method comprising a step of transmitting data and a step of receiving data, the step of transmitting data comprising:

simultaneously transferring ~~a~~ transmitting data to a plurality of parallel data streams;

space time block encoding each parallel data stream in a respective at least one space time block encoder;

coupling at least one space-path spreader to said at least one space time block encoder;

selecting a number of said at least one space-path spreaders in relationship to a number of said at least one space time block encoders to adjust a diversity gain and transmission speed in said communication systems;

spreading the encoded data streams in said at least one space-path spreader with a pre-designed different and orthogonal space-path spreading code codes pre-designed to pre-suppress multiple access interference (MAI) and to pre-equalize multiple paths in the communication system; and

collecting the spread parallel data streams, transferring to a plurality of

transmit antennas, and transmitting data with the transmit antennas through a multiple paths.

15. (Original) The communication method of claim 14, wherein the transmitting data comes from a plurality of users.

16. (Currently Amended) The communication method of claim 14, wherein the transmitting data is sorted by different users and transferred to the parallel data streams of different ~~group~~ groups, and data of all parallel data streams is collected to transmit out with the transmit antennas through the multiple paths after space time block encoding and spreading with the pre-designed space-path spreading code.

17. (Currently Amended) The communication method of claim 14, steps of receiving data comprising:

receiving data transmitted by the transmit antennas through a plurality of receive antennas;

despreading data received by the receive antennas through a plurality of corresponding matched filters in accordance with the pre-designed space-path spreading code;

combining the dispread data with a linear combiner; and

separating mutually interfering ~~signal~~ signals from the combined data with a BLAST detector, and outputting data after multiplexing it with a multiplexer.